

Appl. No. 10/672,437
Amtd. Dated 03/28/2005
Reply to Office Action of October 29, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A hot swappable pulse width modulation switching regulator controller comprising:
 - a hot swap transistor;
 - a pulse width modulation switching regulator controller circuit coupled in series with the hot swap transistor;
 - a hot swap circuit coupled to a control terminal of the hot swap transistor;
 - the hot swap circuit, when the hot swap circuit and the series combination of the hot swap transistor and the pulse width modulation switching regulator controller circuit are coupled to an active source of power, turning on the hot swap transistor at a controlled rate;
 - whereby power is applied to the pulse width modulation switching regulator controller circuit at a controlled rate in spite of the sudden application of power to the hot swappable pulse width modulation switching regulator controller;
 - the pulse width modulation switching regulator controller circuit and the hot swap circuit being in a single integrated circuit.
2. (Original) The hot swappable pulse width modulation switching regulator controller of claim 1 wherein the controlled rate is a predetermined rate of voltage increase.
3. (Original) The hot swappable pulse width modulation switching regulator controller of claim 1 wherein the controlled rate is a rate limiting a current through the hot swap transistor to a predetermined maximum current.
4. (Original) The hot swappable pulse width modulation switching regulator controller of claim 1 wherein the controlled rate is a predetermined rate of voltage increase, or a

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rate limiting a current through the hot swap transistor to a predetermined maximum current, whichever occurs first.

5. (Original) The hot swappable pulse width modulation switching regulator controller of claim 1 wherein the hot swap transistor is part of the integrated circuit.

6. (Original) The hot swappable pulse width modulation switching regulator controller of claim 1 wherein the hot swap transistor is a discrete transistor.

7. (Original) The hot swappable pulse width modulation switching regulator controller of claim 1 wherein the pulse width of the pulse width modulation switching regulator controller circuit starts with a minimum pulse width and increases until the output of a pulse width modulation converter coupled thereto is within regulation.

8. (Currently Amended) The hot swappable pulse width modulation switching regulator controller of claim 7 wherein the pulse width modulation switching regulator controller circuit will start when the voltage applied to the pulse width modulation switching regulator controller circuit approaches the voltage of the active source of power.

9. (Original) The hot swappable pulse width modulation switching regulator controller of claim 8 wherein the pulse width modulation switching regulator controller circuit will not start until the voltage applied to the pulse width modulation switching regulator controller circuit exceeds a predetermined voltage.

10. (Original) The hot swappable pulse width modulation switching regulator controller of claim 1 wherein the pulse width modulation switching regulator controller circuit will start when the voltage applied to the pulse width modulation switching regulator controller approaches the voltage of the source of power.

11. (Original) The hot swappable pulse width modulation switching regulator controller of claim 10 wherein the pulse width modulation switching regulator controller will not

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start until the voltage applied to the pulse width modulation switching regulator controller exceeds a predetermined voltage.

12. (Currently Amended) The hot swappable pulse width modulation switching regulator controller of claim 1 further comprising ~~a switching converter coupled to the controller circuit and wherein converter switching transistors are on in the integrated circuit, the switching transistors being coupled to an output of the PWMSRCC.~~

13. (Canceled)

14. (Currently Amended) The hot swappable pulse width modulation switching regulator controller of claim 1 wherein the pulse width modulation switching regulator controller further comprises circuitry for providing a control output for coupling to control of synchronous rectifiers on the secondary side of an isolation transformer coupled to converter switching transistors on the output of the pulse width modulation switching regulator controller circuit.

15. (Currently Amended) A hot swappable pulse width modulation converter comprising:

a hot swap transistor; and,

~~a converter output circuit; and,~~

an integrated circuit comprising

~~a pulse width modulation switching regulator controller coupled in series with the hot swap transistor, the output of the pulse width modulation switching regulator controller being coupled to the converter output circuit;~~

a hot swap circuit coupled to a control terminal of the hot swap transistor;

the hot swap circuit, when the hot swap circuit and the series combination of the transistor and the pulse width modulation switching regulator controller are coupled to an active source of power, turning on the hot swap transistor at a controlled rate;

whereby power is applied to the pulse width modulation switching regulator controller at a controlled rate in spite of the sudden application of power to the hot swappable pulse width modulation switching regulator controller.

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16. (Original) The hot swappable pulse width modulation converter of claim 15 wherein the controlled rate is a predetermined rate of voltage increase.

17. (Original) The hot swappable pulse width modulation converter of claim 15 wherein the controlled rate is a rate limiting a current through the hot swap transistor to a predetermined maximum current.

18. (Original) The hot swappable pulse width modulation converter of claim 15 wherein the controlled rate is a predetermined rate of voltage increase, or a rate limiting a current through the hot swap transistor to a predetermined maximum current, whichever occurs first.

19. (Original) The hot swappable pulse width modulation converter of claim 15 wherein the hot swap transistor is part of the integrated circuit.

20. (Original) The hot swappable pulse width modulation converter of claim 15 wherein the hot swap transistor is a discrete transistor.

21. (Original) The hot swappable pulse width modulation switching regulator controller of claim 15 wherein the pulse width of the pulse width modulation switching regulator controller starts with a minimum pulse width and increases until the output of the pulse width modulation converter is within regulation.

22. (Currently Amended) The hot swappable pulse width modulation switching regulator controller converter of claim 21 wherein the pulse width modulation switching regulator controller will start when the voltage applied to the pulse width modulation switching regulator controller approaches the voltage of the active source of power across the hot swap transistor falls below a predetermined voltage.

23. (Currently Amended) The hot swappable pulse width modulation switching regulator controller converter of claim 22 wherein the pulse width modulation switching regulator

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controller will not start until the voltage applied to the pulse width modulation switching regulator controller exceeds a predetermined voltage.

24. (Currently Amended) The hot swappable pulse width modulation switching regulator controller~~converter~~ of claim 15 wherein the pulse width modulation switching regulator controller will start when the voltage applied to the pulse width modulation switching regulator controller approaches ~~the voltage of the active source of power across the hot swap transistor falls below a predetermined voltage~~.

25. (Currently Amended) The hot swappable pulse width modulation switching regulator controller~~converter~~ of claim 24 wherein the pulse width modulation switching regulator controller will not start until the voltage applied to the pulse width modulation switching regulator controller exceeds a predetermined voltage.

26. (Currently Amended) The hot swappable pulse width modulation switching regulator controller~~converter~~ of claim 15 comprises a single integrated circuit plus the hot swap transistor as a discrete transistor.

27. (Currently Amended) The hot swappable pulse width modulation switching regulator controller of claim 15 wherein the pulse width modulation switching regulator controller further comprises circuitry for providing a control output for coupling to control of synchronous rectifiers on the secondary side of an isolation transformer coupled to converter switching transistors on the output of the pulse width modulation switching regulator controller.

28. (Original) A method of operating a switching converter having a switching converter controller comprising:

- a) when voltage is first supplied to the converter, increasing the voltage applied to the switching converter controller at a controlled rate;
- b) when the voltage applied to the switching converter controller approaches the voltage supplied to the converter, starting the switching converter controller with a minimum pulse width; and,

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c) increasing the pulse width until the converter comes into regulation.

29. (Currently Amended) The method of claim 28 further comprising preventing starting of the switching converter controller until the voltage applied to the switching converter controller exceeds a predetermined voltage.

30. (Currently Amended) The method of claim 29 wherein the switching converter has an isolated output and further comprising generating a control signal for synchronizing coupling to control synchronous rectifiers in-coupled to the isolated output circuitry.